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Remarks

This is filed response to the Office Action mailed April 13, 2004, citing objection to claim 84 and rejecting the pending claims as allegedly anticipated by Real-Time Innovation, Inc.'s ControlShell User's Manual, Ver. 6.0, published January 1999.

The Claims are Amended for Form

Responding to ¶3 of the Office Action, claim 84 is amended as surmised by the Examiner -- to wit, to that it depends from claim 83. Nice catch.

The Claims are Amended as Patentably Distinct from the Cited Art

This application is generally directed to methods and apparatus for configuring control systems. As noted, for example, beginning at page 5, line 12, of the instant application, these employ "connection" objects (or other data and/or programming constructs) that indicate the permissibility of relationships between other types of objects. Potential relationships between objects of those other types are validated by comparing their respective types with the permissible combinations identified in connection objects. Those other objects can, for example, represent entities within any of (i) a controlled system, (ii) a control system, (iii) an apparatus for configuring the control system, (iv) a control level hierarchy. Such entities include, by way of non-limiting example, field devices, control processors, blocks, loops, compounds, historians, object type category, display placeholders, graphical display entities, and reports.

An apparatus as described above can be used, for example, to facilitate configuring a process control system. Using a graphical user interface, a user can "drag-and-drop" an object that models one system component (e.g., a printer) onto an object that models another component (e.g., an applications workstation), indicating that the user wishes to establish a relationship between those two objects. Through the connection objects, the apparatus validates that relationship and determines its type -- in this case, a parent/child (or other hierarchical) relationship.

Referring to the instant application, at page 5, line 23, apparatus and methods according to the invention can use such connection objects to validate relationships that are peer-to-peer in nature, i.e., source/sink relationships. To illustrate, the user an apparatus according to the invention can select objects that represent field devices and indicate (e.g., via a drag-and-drop operation, a menu option or other command) that she wishes to establish a relationship with an object that represents a control processor. The apparatus can validate that relationship, and determine its type

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(i.e., source/sink), by comparing the proposed combination against permissible pairings in the connection objects.

Methods and apparatus according to the invention can also use connection objects to identify permissible combinations of parameter types (as opposed to, or in addition to, object types) that can form valid parent/child and source/sink relationships.

The pending claims capture one or more of the above.

Thus, by way of example, independent claim 1 recites an apparatus for configuring a process control system, the apparatus comprising a plurality of objects, each of which represents an entity and each of which is associated with an object type. At least one object (the so-called connection object) identifies permissible combinations of object types that can form any of a parent/child relationship, a source/sink relationship, and other relationship. The claim further recites that the apparatus validates a potential relationship between objects by comparing the object types with which they are associated with permissible relationships identified by the connection object.

The remaining independent claims parallel claim 1 in regards relevant hereto. *See*, claim 12 (additionally reciting that the connection object identifies validated relationships established between objects), claims 24, 34, and 117 (objects are associated with parameters that pertain to characteristics of a represented entity, the connection object identifies permissible combinations of parameter types that can form relationships, relationships are established between parameters of one or more objects by comparing the types of those parameters with the types identified by the connection object), claim 44 (combining aspects of claims 1/12 and 24/34), claims 59 and 70 (paralleling claims 1 and 12), claims 82, 92 122 (paralleling claims 24, 34 and 117), claim 102 (paralleling claim 44),

The sole cited reference, the ControlShell User's Manual, does not teach or suggest control configuring apparatus or methods that have the features recited in the independent claims. Although Section 4.2.2 of the manual discusses the need for "ports and connectors" to establish relationships between COG's that represent entities, nowhere does the manual suggest that such ports and connectors could, themselves, comprises objects that identify permissible relationships. Rather, the ports and connectors of ControlShell simply *are* the relationships. As a result, ControlShell fails to provide — among other things — validation capabilities supported by the instant invention's connection objects and recited in the pending claims hereof.

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For this reason, neither claim 1 nor the other independent claims are anticipated by the sole cited reference. This is likewise true of the dependent claims which recite further limitations on the methods and apparatus of the independent claims.

In view of the amendments herein and remarks above, the Applicants respectfully request that the rejection be reconsidered and withdrawn so that this application can pass forward to issuance.

Respectfully submitted,
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